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Investigating the Formation and Substantiation of Anti-Vaccination Attitudes:

A Qualitative Analysis

By

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Submitted to the

Department of Comparative Sociology

of the University of Puget Sound

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in

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Abstract

Despite evidence that vaccinations reduce incidences of disease and spread, certain individuals question vaccine usage and often abstain from vaccination (Dikema *et al.*, 2005 & Salzberg, 2012). Not vaccinating increases the opportunity for certain diseases to enter communities as well as raises healthcare costs.

Existing research of anti-vaccination populations has focused largely on quantitative studies, rarely looking in depth at the individuals that make up this demographic. This study, using qualitative methods, investigated anti-vaccine attitudes, uncovering the underlying processes by which anti-vaccination opinions are created and maintained. Participants were recruited from The Pacific Northwest, a region with the strongest anti-vaccination attitudes in the United States (Omer *et al., 2009* & WSDH, 2012). Data were collected using sit-down and telephone interviews, as well as through questionnaires, then coded based on grounded theory and apparent themes.

Results outlined the importance of social networks in creating and sustaining vaccination opinions. It was also discovered that participants based much of their decision to not vaccinate on anecdotal stories, rather than evidence backed sources. Understanding the deeper rationale of those who oppose vaccinations can help reduce vaccination concerns and potentially lead to public health policy that can increase vaccine use.

Introduction

The Centers for Disease Control and Prevention (CDC) states that "vaccines are responsible for the control of many infectious diseases that were once common in this country and around the world, including polio, measles, diphtheria and pertussis" (CDC, 2012). However, in recent years there has been a steady increase in individuals refusing vaccinations throughout the United States.

Vaccinations are effective in reducing the burden of disease in users. They also protect those without adequate vaccination through Herd Immunity. Herd Immunity functions on the premise that if ~90% of a community is vaccinated, the immunity of "the herd" protects those who are not or cannot be vaccinated (Anderson, 1985). Having a majority of the community vaccinated minimizes the probability of a widespread outbreak as the contagion has trouble spreading to the entire population. According to this theory, increased vaccine refusal reduces the 90% threshold requirement, rendering Herd Immunity ineffective and permitting pathogens to penetrate communities.

An extended reduction in the ~90% threshold can lead to previously removed diseases to return. No longer being prevented through vaccination, diseases that were once endemic in the United States, such as polio and measles, are able to gain footing and recirculate. (Sugarman *et al*., 2010 & Salzberg, 2012).

The cost of treating vaccine-preventable diseases is much higher than paying for the vaccine itself. Previous research has shown that medical-related costs for the treatment of these diseases are 16 times higher than the cost of the vaccines that prevent them. Americans contracting vaccine-preventable disease still result in $1 billion worth of unnecessary healthcare costs each year (Calandrillo, 2005).

To better understand anti-vaccine sentiments, this study investigates qualitatively *why* these individuals initially and continually choose not to vaccinate. Most papers looking at vaccine resistance have studied the *reasons* for not vaccinating, exploring the general opinions of those who refuse vaccinations. This

study delves beyond anti-vaccination opinions; uncovering the underlying process that drives these individuals to adopt particular attitudes.

It is superficial to look solely at the stated reasons for refusing vaccination without acknowledging what created these opinions in the first place. I hypothesize that behind the opinion to not vaccinate lies a particular influence or process that affects these specific attitudes.

To uncover this process, my research studied a population of individuals who refuse vaccination. The Pacific Northwest is an ideal location to conduct this study as it has a very high proportion of individuals who resist vaccination, relative to the rest of the country. (Salzberg, 2012).

Although the Pacific Northwest is an area with intense vaccination attitudes, the majority of anti-vaccination investigations have taken place elsewhere. The few studies that have been executed are largely quantitative, providing specific areas with statistically high anti-vaccination rates such as Vashon and Bainbridge Island in Washington, and Ashland in Oregon. These qualities make this region an excellent sample population, and ideal for utilizing seldom used qualitative methods.

This study is important as it can be used to improve vaccination usage to the benefit of individuals and entire populations. As my research is in collaboration with the Tacoma-Pierce County Health Department, these findings can generate a better understanding of vaccine skepticism and opposition. Increasing professional health knowledge about the specific processes that guide anti-vaccination decisions can help create vaccine-related programs and campaigns that reduce concerns and encourage wider use. Starting these programs can increases cost-effectiveness,

reduce the current incidence of disease, and eliminate the chance of old diseases returning.

Overview of Current Literature

This literature review will explain the wealth of information on vaccine opposition as well as outline certain limitations and particular aspects currently missing from this area of research. Although there is substantial information explaining why people decide not to vaccinate, there is much less illustrating the process they undergo in generating and sustaining these views.

Perception of Vaccines as Unnecessary and Vaccine Exemption

How individuals perceive vaccines plays an integral part in the decision to vaccinate. One perception is that vaccine-preventable diseases are no longer a direct threat to human health, thus, the vaccines that fight them are no longer necessary. A study by Dikema and a committee on Bioethics (2005) explained that vaccines for many diseases such as polio, rubella and measles have been so effective, these diseases are no longer in our everyday consciousness. In fact, many parents have no memory of these devastating diseases, which leads them to see vaccines as unnecessary for themselves and their children (Dikema *et al.*, 2005).

This clinician-based study used qualitative methods, interviewing physicians. Dikema *et al.*, (2005) sought to use the interactions physicians had with their patients to explain vaccination refusal. Although generating useful explanations, it must be noted that these medical professionals are most likely pro-vaccination.

Being in favor of vaccination may produce a bias that downplays or distorts the true sentiments of the patients that refuse vaccination, leading to results that do not accurately depict patient viewpoints.

This study explains how vaccine effectiveness has led to disease reduction, to the point where vaccines are no longer seen as relevant safety measures. Furthermore, it is now widely recognized that as more people refuse vaccinations the occurrence of disease will increase.

Skepticism towards vaccines is best reflected in the rise of non-medical vaccine exemption rates in public schools around the country. Vaccine exemption rates are an ideal measurement of vaccine opinions as they can be measured quantitatively to explain increases in vaccination refusal. Examples can be seen in several counties in Washington, showing exemption rates as high as 25% (WSDH, 2012)

Exemption rates are also useful as they can help delineate specific areas of high vaccine opposition, which tend to be clustered. An article by Omer, Salmon and Orenstein (2009) measured vaccination rates in elementary schools, identifying Vashon Island, Washington and several cities in Oregon as especially prone to vaccination opposition. However, the reasons for these regional differences are not well understood (Omer *et al., 2009*).

Perceptions of Vaccine Safety

Concerns about safety also motivate some people to refuse vaccinations. As mentioned above, negative, less common effects have overshadowed many of the

positive attributes of vaccines. Calandrillo (2005) points out that because vaccines have effectively reduced the burden of disease, their adverse side-effects are become magnified. Instead of focusing on the protective power of immunizations, many people have begun to worry about their rare, ill effects, and elected to refuse vaccination. Calandrillo's (2005) paper was a synthesis of both an annual meeting on vaccination efficacy and a patient-based case study. Similarly to the previous article by Dikema *et al.* (2005), this study looked at patient vaccination attitudes, through physician interviews.

Another study by Cooper, Larson and Katz (2008) explains that vaccines have become a victim of their own success, as people feel more protected avoiding immunization. The authors state that much of this concern about safety stems from a paper by Andrew Wakefield, published in *The Lancet* in 1999, illustrating a correlation between the MMR vaccine and autism. Wakefield's data were later debunked, causing the publisher to retract the article. However, the impact of the claim that vaccines have the potential to do harm remained (Cooper *et al., 2008;* Wakefield, 1999).

The Cooper article, largely a review of the current vaccination literature, is aimed at dispelling vaccine rumors regarding children's safety. The motives of the authors seem to be to promote vaccination and quell anti-vaccination concerns. Despite possessing a pro-vaccination bias, the authors effectively explain the problems associated with faulty perceptions among those refusing vaccination.

Maldonado (2002) focused on psychological misperceptions of risk. She explains how individuals will consistently overreact to low probability risks but

simultaneously under-perceive high probability risks. This can be seen in how parents are much more alarmed by hearing of one death of a child who received an immunization, than about diseases that have killed thousands of people in the past (Maldonado, 2002).

Kahneman and Tversky (1973) further explain this sentiment, illustrating decisions based on the concept of "heuristic availability". The authors argue that personal experiences have more power in influencing decision making than the known probability of the same event. This is important because, although vaccinations statistically have been proven to be safe, individuals will make decisions with what they have personally read or been exposed to in creating their attitudes.

For example, those who do not receive the MMR vaccine are 22.2 times more likely to acquire measles than those who are properly vaccinated. This United States based study expresses the importance of vaccine use. However, individuals still refuse vaccination, stating it is a safer option, even though the probability of side-effects are minute (Feikin *et al*., 2000).

Distrust of Physicians and Understand Vaccine Science

Growing suspicions about vaccines have also manifested themselves in a general distrust of physicians. An article by Benin, Wisler-Scher, Colson, Shapiro and Holmboe (2005) notes that in recent years there has been a surge in strong criticism of medical doctors, especially from parents. For example, parents will challenge doctor recommended vaccination schedules and the purpose of vaccines with their

physician. One study by Gust, Darling, Kennedy and Schwartz, (2008) used a survey to explain how the reasons for this distrust differ. Their paper looked at parents who actively refused immunizing their children, compared with parents who were simply hesitant, outlining differences in their views. This study was interesting as the reasons varied depending on the parent. Some questioned the safety of the vaccines in challenging vaccination, while others believed that physicians were promoting vaccines for their own personal monetary gain. Overall, illustrating the wide variation in the reasons for refusing vaccination. (Gust, Darling, Kennedy, Schwartz, 2008).

An article by Benin *et al.* (2005) examined mothers and their reasons for refusing vaccination, using a qualitative approach involving interviews and focus groups. This was one of the few articles with a relatively neutral vaccination standpoint in explaining results (as demonstrated by its use of articles from known anti-vaccination magazines to explain its findings).

Although unable to explain the process that generated this recent opposition towards physicians, the authors hypothesize that the rise may be related to a "faulty understanding of science" (Benin *et al.*, 2005). The article explains how individuals have begun to feel that they have sufficient understanding of health and medicine to make their own decisions. Individuals felt they no longer needed their physicians' guidance, even if the information they had personally acquired was false. Benin *et al.* (2005) refrain from explaining the specific motives behind anti-vaccination opinions, however suggest that vaccine non-compliance goes hand-in-hand with patient autonomy.

Conclusion

The preceding articles effectively illustrate the current breadth of research on vaccine refusal. These papers primarily focus on the reasons for not vaccinating, providing an excellent foundation for the present study. The majority of anti-vaccination studies rarely focus on understanding the process by which anti-vaccination views are formed and sustained. Much of the current research concentrates on physicians and their understandings of vaccine refusal. Although undoubtedly knowledgeable about vaccines, medical doctors do not share, or necessarily seek to recognize, the unique rationale and beliefs held by those who refuse vaccination. Such an understanding can only be gained from the anti-vaccinating populations themselves. It must also be noted that studies under clinician guidance display a strong bias against vaccination refusal. This feature predisposes the study itself to biases, and therefore possibly rendering the research unreliable.

Parenting also proved an important population for vaccination refusal, specifically the different influences that generate their decisions. Preliminary informal interviews also showed parents to be the most active in opposing vaccination, alluding to an important population that was sampled in this study.

Several articles illustrated the high rates of vaccine refusal discovered in the Pacific Northwest, but few have unearthed the reasons for this regional variation. This study will utilize the regional increase in vaccination refusal, to provide a

deeper insight into the process by which the anti-vaccination population forms and sustains their views.

Methods

This study used qualitative semi-structured and structured interviews as well as questionnaires to uncover the deeper attitudes of anti-vaccination in adults. Previous anti-vaccination research has been mostly quantitative, producing statistical findings. Statistical findings create an excellent foundation for this study; however, such studies do not possess the necessary depth to unearth the deeper processes behind anti-vaccination attitudes. The use of qualitative methods will assist in elucidating this information.

Although less common, there is a smaller proportion of research investigating vaccination opinions qualitatively. These studies tend to be conducted by physicians, or other health professions, who use patients as their sample. Health minded individuals possess an inherent bias in favor of vaccination, thus, may unknowingly influence participant responses. Having a neutral viewpoint, I reduce the possibility of biasing my participants, promoting more accurate findings.

Acquiring the population

Previous studies by Omer *et al.* (2009) have shown that Washington and Oregon have higher vaccine opposition than anywhere else in the country. Despite having sizeable numbers opposing vaccination, this part of the country has not been a focus of anti-vaccine study. To remedy this, I selected participants from this region.

Using snowball sampling, I interviewed thirteen individuals. Participants were recruited through acquaintances and other social connections who resided within the research location. Snowball sampling acted as an effective method, as those who refused vaccination tend to have robust social connections. This created an excellent pool for finding subsequent informants. Early in the research, parents were shown to possess especially strong attitudes regarding vaccines. Recognizing this, they were targeted for inclusion in this study.

The interview is critical in learning the motivations behind anti-vaccination attitudes. All interviews lasted approximately sixty minutes and began with broad, open-ended questions. Starting the interview this way allowed the informants to express themselves freely. An example of an initial question was: “Tell me about your thoughts on vaccines?” This question is purposefully open and neutral. This allowed the participant to direct the conversation in a way that was personally relevant. Later in the interview more in-depth questions, that were specific to my central research focus, were asked such as: “what do you think influences you to refuse vaccination?” Probing techniques were also crucial in the later parts of the interview. These included asking participants to reflect on earlier statements that were relevant to my research, or simply asking them to add to them.

Some participants were uncomfortable discussing their vaccination opinions in detail. In the past, participants had been met with strong opposition when discussing their vaccination attitudes with others. As a result, some participants were initially hesitant to discuss their views. To overcome this discomfort, I began the interview with broad questions that later narrowed. Broad questions relaxed

the participant and allowed them to organically drive the interview towards their deeper opinions. As the participant felt that they had some control of interview, they were more likely to freely share their opinions and therefore, answer questions that pertained to my research question. All interviews began by acquiring verbal consent and informing the participant that participation was completely voluntary.

Due to time and distance constraints, two participants who resided in further away locations were interviewed via telephone or email. Although unable to conduct sit-down interviews, few differences were seen between those interviewed in person and those through email and telephone.

The cognitive aspect of decision-making, as explained by Kahneman and Tversky (1973) was recognized in creating interview questions. Their theory of "heuristic availability" explains that an individual's experience is more influential on decision-making than statistical probability. Recognizing this, many questions looked into if specific personal experiences influenced informants to possess certain opinions on vaccination. Their answers helped determine if this theory plays an important role in generating certain anti-vaccination sentiments.

Several demographic variables (income and education) have been found to influence vaccination attitudes (Dikema *et al.*, 2005 & Salzberg, 2012). Questionnaires were utilized to acquire basic demographic information regarding the participant, such as median household income, age, sex and marital status. This method was helpful in determining if there were any correlations between certain demographics and vaccination opinion. (See Appendix for copy of questionnaire).

Analysis Methods

Audio-data were collected and recorded using pseudonyms. These pseudonyms were then deleted following verbatim transcription. Transcriptions were coded and analyzed for content that revealed examples of the research question.

Grounded Theory acted as the primary method used for both acquiring and analyzing information. This allowed for themes and recurrent ideas to be identified during interviews. Once commonalities had been discovered, specific coding techniques were utilized to effectively express the results (Bernard, 2006). These techniques included searching for key words that reflected the motivations behind vaccination refusal. Commonalities either voiced or viewed were recorded and used in mapping particular themes. These themes were compared and contrasted to gain a better understanding of how they related to one another. Conceptual mapping was also used to better understand how specific themes interacted.

Results and Discussion

The focus of this research was to understand the process by which anti-vaccination opinions are generated and sustained. To uncover this, I examined the most common themes that emerged from the interviews. From discussions and conversations with participants, a picture emerged, illustrating the process by which participants came to hold anti-vaccination views.

To adequately convey this process, the following sections are set-up in a timeline fashion exploring the changing mindsets and attitudes towards vaccination. Starting with informants' first introduction to anti-vaccine sentiments, we move to how their views were modified and strengthened. I conclude with how certain factors helped sustain participants' opinions to refuse vaccinations, exploring theory to help explain the process.

The informants all shared a similar middle-to-high economic status with a median household income of around $70,000. All thirteen participants had completed undergraduate degrees, half possessing master degrees. Twelve informants were Caucasian, one participant being of Asian descent. Twelve of the thirteen participants had been married (two were divorced). Ten of the thirteen were female and twelve of the participants had at least one child. The average age of the participants was 45 and all participants cohabitated with either a spouse or partner. All thirteen participants had originally been in favor of vaccines, but at some point in the past underwent a change in their opinion. On average, those interviewed changed their attitude towards vaccination at the age of 39.

The Role of Media and Social Contacts in Initiating Change in Vaccination Opinions

The central question of this paper focuses on explaining how anti-vaccination attitudes are formed. To understand this, it is essential to learn how informants are introduced to a skeptical view of vaccines.

From numerous interviews and emails, common themes arose showing how participants' anti-vaccination attitudes first originated. According to many informants, television, newspapers and online articles were influential in challenging their previously held idea of vaccination. In fact, five of the thirteen participants explained that seeing a news article or a television special were their first exposure to negative information about vaccinations.

From interviews, I learned these media outlets varied in how they challenged vaccination. These reports did not solely focus on the safety aspects of vaccines, the most common reason to question vaccinations, but expanded to other frequent motives to question vaccine use (Calandrillo, 2005). Several informants remembered news reports that explored the negative role pharmaceutical companies played in vaccine use. Others pointed to newspapers that argued that vaccination was a violation of civil liberties.

These five informants explained how they were initially skeptical of the broadcasts, but they remained curious. *"I was surprised by how much the news report affected my viewpoint [on vaccination]. I had always felt comfortable with my decisions until then".*

Seven of the thirteen informants expressed how their initial exposure to anti-vaccination sentiments came from social contacts, who already held anti-vaccination opinions. For this study, "social contacts" or "networks" are defined as individuals that the participant feels comfortable discussing sensitive information with and spends time with regularly. More specifically, these include spouses, family members and close neighbors and friends. According to these seven participants,

their first encounter with anti-vaccine sentiments emerged from these types of social contacts. Many explained how their introduction stemmed from casual conversations with friends or family, where the conversation turned to parenting or topics on health.

Like those first exposed through media, these respondents were initially skeptical of what they were told, but modified their views after further discussion. Participants who were introduced to anti-vaccination attitudes via trusted confidants had a noticeably more challenging time disagreeing with them.

These social contacts were close friends or family, and the participants believed what they were told. This was illustrated by one participant; *"My doctor told me the benefits outweighed the risks, and I trusted his professional opinion. But this was my sister, who I had grown up with and trusted".* However, informants whose vaccination views were first challenged through media recognized the inherent uncertainties that came with this source. They were at first skeptical, recognizing the inherent biases within media and that this source was not always truthful.

Of the thirteen interviewees, one participant had a distinct introduction into vaccine criticism. This individual's initial concept of vaccines as beneficial was shattered after her child underwent a lethal reaction to a vaccine, soon after birth. The death was attributed to a rare side-effect of the particular vaccine. Following the event the participant explained, *"She was so healthy before the vaccine. I could see her deteriorate after the shot and I couldn't help but think there must have been a connection".* As a result of this dramatic experience, the informant underwent a

particularly strong opinion reversal regarding the safety of vaccinations. Such powerful personal experiences are important in explaining how negative vaccination attitudes are understood and sustained, as we shall see later in this paper.

These introductions to anti-vaccination opinions were paramount in catapulting the participant into their own, new understanding of vaccinations. Similar influences continued to be important later in how informants sustained their vaccination rationale. Now holding negative vaccine beliefs, informants began to further justify their thoughts through personal investigation.

How Informants Made Sense of Their Changed Vaccination Understanding

After exposure to new views on vaccines, informants took it upon themselves to investigate further. This period of exploration, as illustrated by one participant, felt like a time of "*limbo*", in which they were unsure which side they fell on, neither denying nor agreeing with vaccinations. The mechanism and tools for gaining information regarding vaccinations varied depending on how informants "researched" the topic. Many were influenced by their initial introduction.

Those who were initially introduced to anti-vaccination attitudes through media tended to be the most determined to investigate further. This matches with the earlier finding that participants tended to trust information from media less. Some looked to other media outlets, to increase their search range. While others used more extensive research methods; looking into peer-reviewed research papers to verify their initial discoveries.

Those who were introduced to anti-vaccination opinions from social contacts were less likely to do much more research. According to informants, this difference was attributed to trust in their confidants. Informants who were first exposed to these attitudes from friends and family often saw them as the most trust-worthy sources. These individuals did do outside research, but not to the same extent as those informants whose vaccination attitudes changed because of media reports.

Individuals who discovered anti-vaccination opinions through the media also began to discuss this issue with their own social contacts. Illustrating the important role of social contacts for both groups in substantiating their anti-vaccination sentiments. This was further illustrated by one participant:

> *"Having my nearby friends – especially my husband – were so important in talking through my thoughts about vaccinating ourselves and kids. I feel more relaxed when I'm talking to them and I know I can trust what they are saying."*

As the participants deepened their education about the dangers of vaccination, they grew more confident and justified in their point of view. The same participant, who had mentioned feeling in "*limbo*", emphasized how she no longer felt suspended between the two opinions after further researching the topic. She explained that by *"Looking through the reports I could find and talking with my husband and next door friends I felt more in control of my choice to vaccinate or not. I felt much more empowered."*

Finally, participants explained how their investigation into vaccinations never ends. Informants were able to grasp their new viewpoints toward vaccines, yet felt that their understanding needed to be continually explored. As explained by

one informant, she now felt "*super-charged*" and "*committed*" to better understanding the impact of vaccines. Explanations of this drive to sustain their viewpoints will be explored in the next section.

Continued Support of Social Contacts and Response to Pro-Vaccination Challenges

Once participants were able to rationalize their new vaccination perspectives, they searched for ways to learn more about the topic. Most had already researched and validated their critical views of vaccines, but continued to search for new ways to substantiate them. This was done through both new approaches and several of the same methods used to initially introduce informants to thinking critically about vaccinations.

Social contacts continued to influence the informants. After conducting their own personal investigations, many participants used social contacts to discuss their thoughts on what they had discovered. Many of the informants described meeting in groups to converse about the latest news about vaccinations. These individuals emphasized feeling comfortable together, describing how family and friends offered closeness and "*safe*" environments. Talking to these groups acted as an outlet for their thoughts, worries and ideas on vaccination. The informants' social networks provided a source of information for them to learn more about the topic, reinforcing their views.

Informants also explained how they were confronted with articles firmly expressing the positives of vaccination. During interviews I asked participants what

they thought of these arguments, many of which were in scholarly, evidence-backed journals. From these questions I discovered an implicit confirmation bias that influenced how the informants chose their sources. Although never explicitly stated, many informants described pro-vaccination reports as "*useless*", "*one-sided"* and "*not taking in the full picture*". Suggesting they had little interest in counter-arguments when choosing their sources.

Moreover, several informants felt that research studies supporting vaccination backed pharmaceutical companies looking to sell more vaccines and thus were subject to conflicts of interest. Similarly, others saw physician-based studies as biased, stating that these studies were driven by monetary gain motives.

Curious about their distrust of pro-vaccination reports, I looked deeper into how informants chose their sources. I deliberately asked questions about what they thought were quality documents and how they decided to believe certain arguments over others. In doing so, I discovered that over half of the participants were guided by personal stories and accounts from others. I learned that the informants' own understanding of vaccination was largely decided by the negative interactions others had with vaccinations. These could be tales of someone's child who allegedly developed Autism after receiving a vaccination, or a blogger illustrating physicians being controlled by pharmaceutical companies.

Personal narratives told to participants from social contacts also prompted anti-vaccination opinions. Similar to before, informants placed a lot of trust in close friends and family. Hearing anecdotal stories and experiences from social contacts held more weight than stories heard from second hand sources.

Discussion of "Heuristic Availability"

The way an individual understands vaccine usage stems from a specific logic. In reaching conclusions, we recognize the importance of trusted, repeatable data. This logic is essential in conceptualizing the pros and cons of vaccines, and subsequently influencing vaccine opinions.

Research by Kahneman and Tversky (1973) explains how this logical methodology is sometimes not used. In fact, the authors outline how we often do the opposite. Their paper explains this idea as "heuristic availability", stating, that although we are presented with objective data, we often side with a less scientifically proven, personal story. The authors argue that personal experiences have more power in influencing decision making than the known probability of the same event. This is important as vaccinations have been proven statistically to be safe, yet, individuals will make decisions based on what they have been exposed to or personally read.

A recent paper by Schwarz and Vaughn (2002) expands on this idea explaining how personal experiences can lead to "gross underestimations" of potential dangers when making decisions. Although this paper dealt with consumer spending, similarities with the decision to vaccinate can be made about how individuals ignore the protective nature of vaccines. Another article by Keller, Siegrist and Gutscher (2006) explains the importance of the "feelings and affect" that influence decision making with regards to natural disasters. This study discovered that individuals surviving floods and earthquakes were more likely to

purchase additional flood and earthquake insurance. Although each disaster was mutually exclusive, individuals based their subsequent decisions on personal experiences, rather than actual probability. Additionally, participants remembering flood related images assessed a greater risk than participants who could not remember such images. Overall these examples illustrate how, "people disproportionately weigh salient or vivid evidence even when they have better sources of information", in making decisions (Keller, Siegrist and Gutscher, 2006).

This post-disaster decision-making is comparable with vaccination decisions. From interviews, I discovered that personal stories played a significant part in how informants reached their conclusions. These types of “sources” eclipsed in-depth scholarly research on the topic, as the informants felt justified in learning about vaccination from these varies personal stories.

The best example of this concept was seen with the informant whose vaccination skepticism began after her child’s dramatic death. This informant was not introduced to vaccinations primarily through media or social contacts like most interviewed. Instead, this informant based her perception of vaccines on what had occurred personally to her own child. Comparably with other participants this participant had a more extreme anti-vaccination stance. In line with previous research on decision-making, her choice to not vaccine was guided by what she had experienced, instead of objectively researched.

Limitations to the Study

The Pacific Northwest was chosen to ensure that I studied a population with the highest rates of vaccination exemption in the country and address a location that had been rarely studied. Yet, even with the benefits of researching this population , limitations exist. Many of the locations researched were made up of tight social connections that placed an emphasis on close communities. From my findings, social networks have powerful influences in creating and sustaining vaccination opinions. Recognizing this, there is a possibility that these findings are largely influenced by the location. As a result, other areas with high anti-vaccination sentiments may not reflect the same strong influence of social contacts.

Some individuals can be exposed to anti-vaccination opinions and undergo an attitude change in childhood. This study found individuals who had their opinions of vaccination changed in adulthood. Having anti-vaccination opinions at an early age may influence how the individuals understands and perceives vaccinations then and later. As a result, this study is limited to those that arrived at an anti-vaccination viewpoint later in life.

All individuals chosen for this study were critical of vaccinations; were presented with the viewpoint, and chose to believe in it. Of course, some individuals presented with anti-vaccination viewpoints may refrain from siding with this opinion. Recognizing this, I cannot report on how effective certain introductions to anti-vaccination viewpoints are, as all informants for this study chose to agree with them.

Lastly, the present research purposely strayed from the specific reasons people chose to not to vaccinate: this area has largely been researched already. I recognize that the process participants undergo in changing their vaccination status may subsequently influence specific reasons for not vaccinating. However, I hope to reconcile this by illustrating how these deeper generated opinions play the largest role in creating anti-vaccination opinions and understanding the motivations behind them.

Conclusion

This study was successful in uncovering the process by which informants created and maintained their anti-vaccination opinions. Social contacts, both face-to-face and online, were essential in influencing how the informants made justifications about their decisions. These contacts acted both as a tool for introducing the participants to the idea of anti-vaccination opinions, as well as a source for continuing their investigation.

Another important finding was the influence of personal accounts. Anecdotes or stories told by the informants' close friends or media outlets explained specific examples of the negative aspects of vaccinations, subsequently influencing how the informants perceived vaccinations. Personal accounts continued to play a role even after their initial introduction, further assisting the informants' justification of anti-vaccination sentiment.

With regards to future work, it would be interesting to determine how marriage influenced anti-vaccination views. Twelve of the thirteen participants had

been married, leaving little room for comparison in this study. Very little research exists on the relationship between marriage and vaccination opinions. Also, conducting a future study comparing those who refuse and those in favor of vaccination would produce more robust results, especially in the same population as the present study. Due to time constraints the influence of various websites and blogs on the participant's attitudes could not be fully addressed. In the future, conducting an effective content analysis of these online sources could better determine how the internet's role affects vaccine refusal.

This research addresses a current gap in the literature on populations that refuse vaccination. While most studies regarding vaccination have been quantitative, this study utilized qualitative methods. In doing so, it elucidates specific opinions and ideas that would be difficult to acquire with quantitative methods. This study also addressed a population in the Pacific Northwest that had not been widely investigated. The information discovered about this population can give future researchers an insight that was previously non-existent.

Lastly, the purpose of the paper is to better understand the process and motivation by which individuals refuse vaccination. Understanding this produces practical answers and subsequent recommendations for relevant public health problems. As explained earlier, decreases in vaccine use increases the chances of pathogens entering communities and government healthcare spending. By generating policy or programs that promote vaccines to those who are hesitant, diseases have a smaller chance of infecting others. Understanding the important role social contacts have in promoting anti-vaccination sentiments can be used in

creating useful programs. These programs could be designed to specifically address social groups, or clusters that refuse vaccination. Additionally, it is important to recognize the logic and “available heuristics” that are utilized in making decisions about vaccinations. Recognizing this mode of thinking when developing health programs can assist in promoting the benefits of vaccine use.

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Appendix

Copy of Questionnaire:

Investigating the Formation and Substantiation of Anti-Vaccination Attitudes

Demographic Questionnaire

My name is Ned Sherry and I am a student at the University of Puget Sound studying vaccination opinions. I am interested in determining vaccination attitudes among individuals who refuse to vaccinate. The completion of this survey is completely voluntary and all responses are anonymous.

1) Age: _____

2) Gender: _____

3) Cohabitation status (please circle):

Living Alone - Living with Spouse - Living with partner - other:_____

4) Number of Children: _____

5) Household Income (write in): $_____

6) Relationship status (please circle):

Married Single Divorced (and remarried) Divorced (and single)

7) Ethnic Origin: _____

8) Age at which your vaccination attitudes changed: _____ years old

9) Education Background (please circle):

No High School High School Only Some College Two Year Degree

Four Year Degree Graduate/Professional Degree

Other: _____